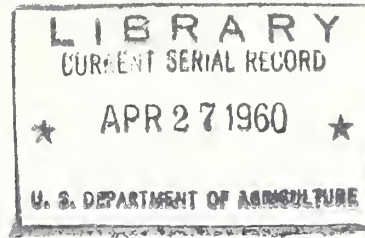


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*Improved Facilities for*

**WASHING and DISINFECTING  
LIVESTOCK  
TRUCKS**

**AMS- 375**

**U. S. DEPARTMENT OF AGRICULTURE  
Agricultural Marketing Service  
Transportation and Facilities  
Research Division**

## PREFACE

To find ways to increase efficiency in marketing farm products, the Agricultural Marketing Service has made studies of many kinds of marketing facilities and equipment. Recommendations were made as to the type of layout and design needed to perform marketing operations more efficiently. One field of study covers livestock marketing facilities.

Truck washes, for efficiently cleaning and disinfecting trucks, are deemed by many market operators to be essential to minimize the spread of livestock diseases and to provide good service to market patrons.

This report provides data and guidelines for use in designing an efficient truck wash facility.

Special acknowledgment is made to Raymond Duncan, stockyards engineer, St. Joseph Stock Yards, South St. Joseph, Mo., for providing engineering data and estimates on construction costs, and for suggestions during preparation of the report. Arthur F. Schramm, industrial engineer, Livestock Division, Agricultural Marketing Service, reviewed and made constructive comments on the manuscript.

This report is a byproduct of a broader study on improved livestock marketing facilities and work methods, conducted under the general supervision of George E. Turner, marketing research analyst, Transportation and Facilities Research Division, Agricultural Marketing Service.

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# IMPROVED FACILITIES FOR WASHING AND DISINFECTING LIVESTOCK TRUCKS

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## INTRODUCTION

Most livestock are transported by truck to and from the 65 terminal stockyards and 2,300 livestock auction markets throughout the country. Modern livestock auction markets and terminal stockyards can render a valuable service to their patrons by providing convenient and efficient truck wash facilities for cleaning and disinfecting livestock trucks. Clean and properly disinfected trucks are needed to minimize the spread of livestock diseases. In some instances, both terminal stockyards and auction markets have well-designed truck washes. Many markets, however, have poorly designed washing facilities or none at all. The objective of this report is to suggest a layout for a highly efficient truck wash.

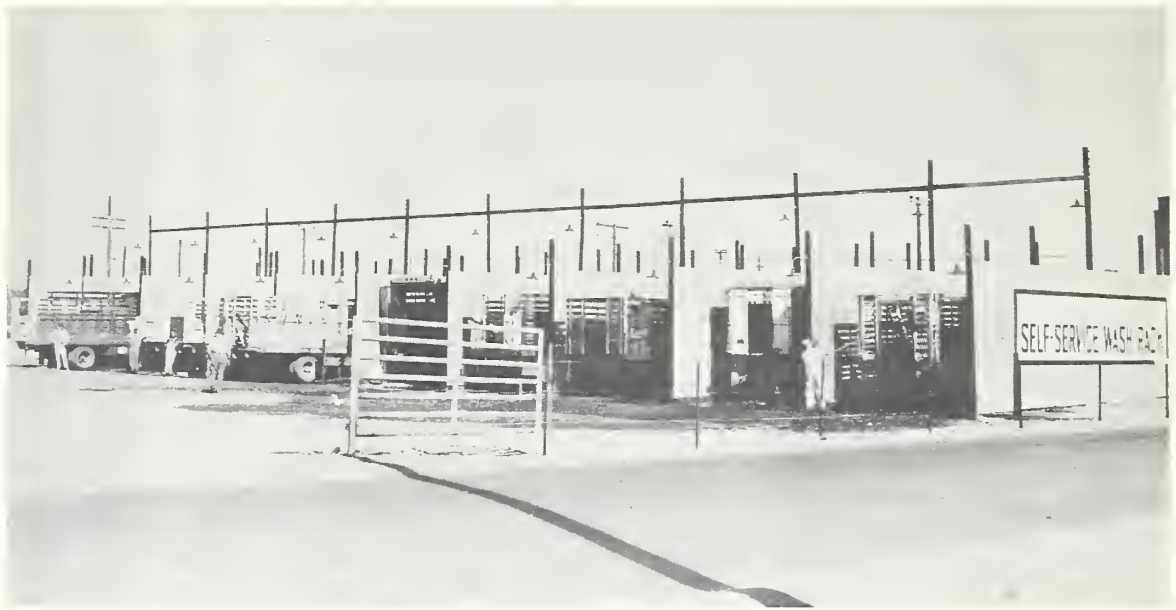
Most livestock markets consider a truck wash as a service facility for producers and truckers hauling livestock to and from the market, and not necessarily as a revenue producer. A nominal charge is often made for the service, however, to help maintain the facility.

## TRUCK WASH OPERATIONS

Three major operations are performed in washing trucks. They are: (1) Positioning the truck for washing, (2) washing it, and (3) disinfecting it. Well-designed truck wash facilities are needed to perform these operations efficiently (fig. 1).

### Positioning Truck for Washing

The sizes of trucks washed on most livestock markets vary widely, ranging from small pickup trucks to tractors and trailers more than 50 feet long. Positioning the trucks for washing involves driving the truck into the wash area and subsequently into the wash stall. The efficiency with which the operation is performed is dependent on the size of the approach apron. Approach aprons that are too small frequently cause large trucks to do considerable maneuvering before they can be positioned in the wash stalls. For maximum operating efficiency, the truck wash should have an approach area large enough to permit large trucks to drive directly into the wash stalls.



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Figure 1.--A well-designed truck wash area with 10 stalls, at a terminal stockyard.

#### Washing Trucks

The driver usually washes his own truck after he positions it in the stall. He picks up the nozzle end of the hose, turns on the water, and washes the body of the truck and the truck bed. For the greatest efficiency, the stall should be large enough to handle all sizes of trucks. Furthermore, the stall should have sides of sufficient width and height to prevent spraying of water on open areas, or on a driver washing a truck in an adjacent stall. The floor of the stall should be on a grade, so that when a truck is in position to be washed the rear of the truck bed is slightly lower than the front. This permits the driver to wash the truck bed from the front and allows the water and trash to drain from the rear.

#### Disinfecting Trucks

After trucks are washed, they are driven from the wash stall to an auxiliary house in the wash area where disinfecting supplies are kept. The driver obtains the nozzle of the hose connected to the disinfecting tank and sprays the truck thoroughly. The auxiliary house should be located at the rear of the exit apron so that it is easily accessible to trucks of all sizes. The exit apron of the truck wash area should be large enough to permit ready egress for all types of trucks.



## A PROPOSED LAYOUT FOR A TRUCK WASH

To illustrate the principles of layout for an efficient truck wash and to show the facilities needed, a wash with two stalls was selected. A truck wash of this size probably would be adequate for many small markets. However, large livestock markets probably would need a wash with more stalls. Therefore, the principles of the layout provide for expansion of the facility.

### Facilities and Equipment Needed

The facilities and equipment needed for a two-stall truck wash are discussed by component parts of the facility, which are: (1) Truck entrance apron, (2) truck wash stalls, (3) truck exit apron, (4) auxiliary house, and (5) fences.

#### Truck Entrance Apron

The truck entrance apron should be large enough to provide ready access to the stalls for the largest trucks patronizing the market. An entrance apron about 36 feet wide and 70 feet long is suggested for a wash with two stalls (fig. 2).

The surface of the entrance apron should be rolled gravel on a compact base.

#### Truck Wash Stalls

For the purposes of this report, a wash stall consists of the floor and walls and the water, drainage, and lighting systems.

Floor.--The floor of a wash stall should be 15 feet 6 inches wide and 57 feet long, constructed of smooth concrete. This width allows the truck to be positioned easily and provides adequate space on each side of the truck for the worker washing it. The length is adequate for positioning all wheels of the truck on concrete. The concrete floor should be 6 inches thick, reinforced with wire mesh, and laid on a 4-inch-thick gravel base.

The concrete floor should consist of two sections separated crosswise by an open drain 6 feet from the entrance end. Both sections should be constructed with a 4 percent grade toward the open drain, so that water on the floor may drain off quickly. One section, 6 feet long and 15 feet 6 inches wide, should extend between the gravel-surfaced entrance apron and the open drain. The other section, 50 feet long and 15 feet 6 inches wide, should extend between the exit apron and the open drain (fig. 2).

On each side of the floor, a curb 6 inches high and 6 inches wide should be constructed to prevent water from running into an adjacent stall or other areas near the stalls. The curbs should be 40 feet long, starting 5 feet back of the open drain and extending to within 5 feet of the exit end of the floor.

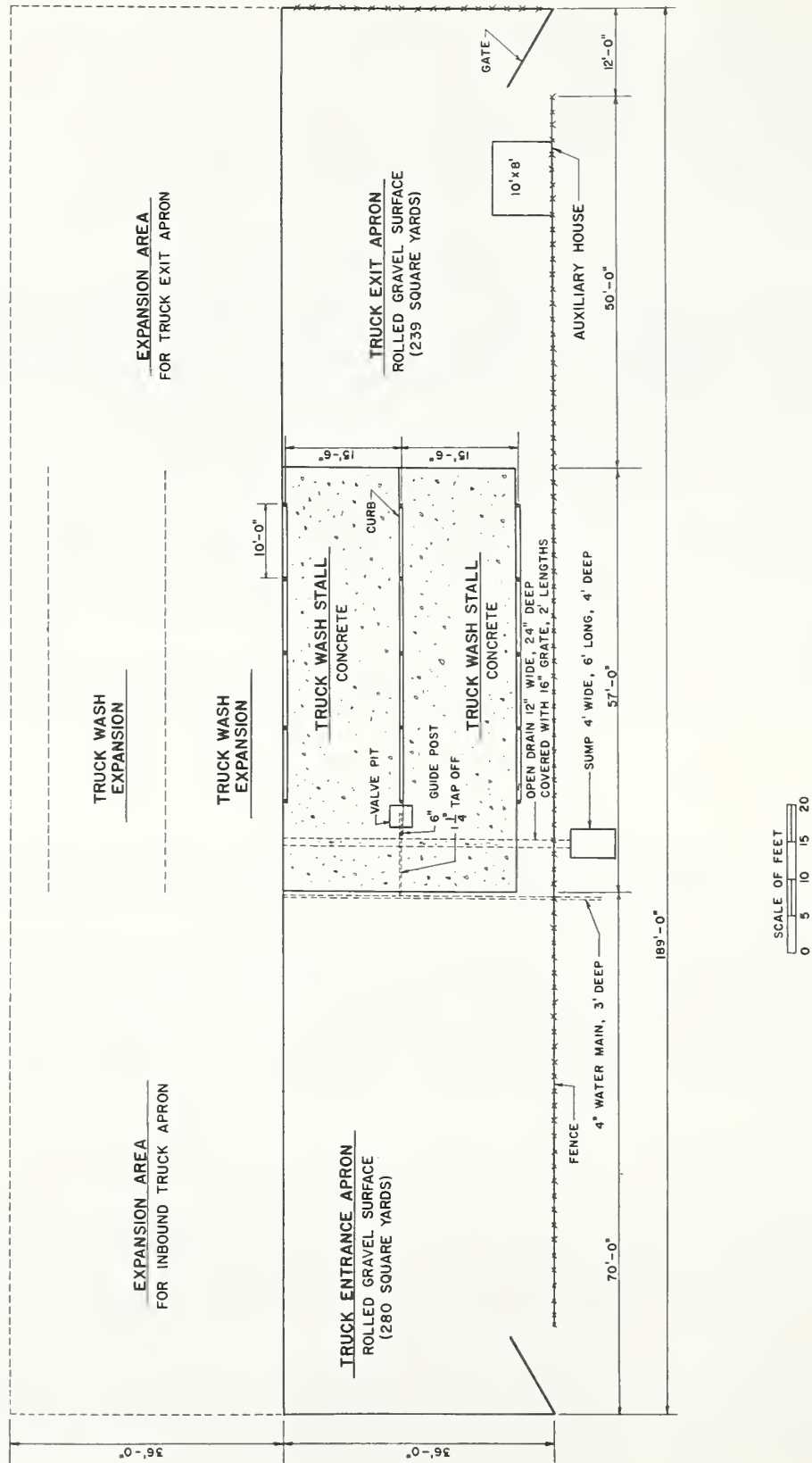


Figure 2.--A suggested layout for a truck wash with two stalls.



The suggested design of the open drain is discussed under Drainage System.

The floor of such a two-stall truck wash would cover an area 31 feet wide and 57 feet long.

Walls.--A wash stall should have walls on each side and should be open at both ends. The walls should be 12 feet high and 40 feet long, covering the same distance as the curb, and should be constructed of 28-gage (minimum) corrugated sheet metal (fig. 3). Five poles, 5 inches in diameter at the top and on 10-foot centers, should provide adequate framework for each side of the stall. The poles should be set 4 feet in the ground and anchored in concrete. The center pole should be 25 feet long. It is used to tie horizontal bracing between stalls and to support the overhead lighting system. The horizontal bracing on the center pole should be 2 by 6 inches and should be about 3 feet from the top. The other four poles of each wall should be 20 feet long.

The five poles providing the framework for the wall should be either creosote pentra-treated pine, or wood of comparable quality, and should have three 2- by 6-inch horizontal lengthwise braces. The top horizontal brace should be about 6 inches below the top edge of the corrugated sheet metal; the bottom one, about 12 inches above the concrete curb; and the middle one midway between the top and bottom braces. The corrugated sheet metal should be attached to the horizontal braces.

Water system.--A 4-inch water main should be adequate for the facility. The water main should be about 3 feet below ground level and at least 12 inches below the frost line. The main should be located in front of and parallel to the entrance end of the concrete floor of the wash stall. This location permits work to be done on the main without breaking the concrete flooring. The water main should extend the full width of the two-wash stall (31 feet), so that additional stalls can be added without serious disruption of the washing service. In addition to the 31 feet of main, additional footage of main is required to tie into the city water system. A small booster water pump is necessary for those markets not having access to municipal water or adequate water pressure.

A 1-1/4-inch tap-off should be located at the entrance end of the center wall of a two-wash-stall facility. Two hydrants should be provided, with 50 feet of 1-inch hose attached to each. An adjustable nozzle should be attached to each hose to control the flow of water. Provision should be made for cutting the water off below ground level to prevent freezing.

A guidepost should be located in front of each hydrant to prevent damage from trucks maneuvering to enter the wash stall. A treated pole, about 6 inches in diameter and 6 feet long, anchored in concrete, is suggested for the guidepost.

Water pressure of about 90 to 120 pounds is suggested for washing a livestock truck.

Drainage system.--Proper drainage is highly important both to prevent water from standing on the floor of stalls and to maintain sanitary conditions. An open drain and a sump are suggested for drainage. The location of the open



Figure 3.--A suggested wall design for a truck wash stall.

drain in the floor of the stall has been discussed. The drain should be about 12 inches wide and 24 inches deep. The bottom should be rounded so that solid material will flow through it more freely. The drain should be of concrete, with sides and bottom at least 4 inches thick.

The open drain for two wash stalls should extend the width of two stalls (31 feet) and an additional 8 feet to the sump. The drain should be constructed with a 1.5 percent grade.

The open drain should be covered with cast iron grates about 16 inches wide and 24 inches long. The short lengths can be removed easily for cleaning out the drain, which should be done about once a week.

A sump should be provided, into which the drain should empty. The sump should be about 4 feet wide, 6 feet long, and 4 feet deep. The walls of the sump should be of 4-inch-thick concrete.

At least a 4-inch outlet should be located near the top of the sump, to permit drainage of liquids. The outlet should be connected to a city sewer if it is available and if the connection is permissible. Otherwise, a tile drainage field should be provided. The size of the drainage field depends on local soil and climatic conditions. The sump should be inspected daily and cleaned out when it needs it.

Lighting system.--A lighting system is suggested so that washing may be performed at night. The electric light line should be attached near the top of the center pole. A 200-watt light with a reflector should be attached about 4 feet from the top of the pole. A second 200-watt light and reflector should be attached near the top of the first pole on the entrance end of the stall. These two lights should provide adequate visibility; however, a third light might be provided at the exit end of each stall if desired.

#### Truck Exit Apron

The truck exit apron is used for trucks leaving the wash stall and taking a position at the auxiliary house for disinfecting. It should be large enough for the largest trucks patronizing the market. An exit apron about 36 feet wide and 62 feet long is suggested. The surface of the exit apron should be rolled gravel on a compact base.

#### Auxiliary House

An auxiliary house is suggested as a shelter for the disinfecting equipment (fig. 4). The disinfecting equipment includes a pump, disinfectant tank, hose, and nozzle.

The auxiliary house should be near the gate on the exit apron and in a position easily accessible for the trucks. It should be about 10 feet long, 8 feet wide, and 8 feet high. Wood or cinder block construction should be adequate.



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Figure 4.--An auxiliary house in a truck wash area for housing disinfecting equipment and materials.

A pump is necessary to agitate the disinfectant mixture and to provide pressure to spray the mixture onto trucks. An electric one-horsepower centrifugal pump is suggested for this purpose. A 200-gallon disinfectant tank is suggested.

A hose about 50 feet long and about 3/8-inch inside diameter should be connected to the tank for spraying trucks. A spray nozzle should be provided.

The disinfectants to be used vary from area to area and season to season and are suggested by appropriate agencies of the United States Department of Agriculture.

#### Fences

The truck wash area should be protected by a fence from unauthorized parking and other interferences with efficient washing operations.

It is suggested that the truck wash area be so located on the market site that two sides of it are the outer boundaries of the site. Such a location requires fencing of only two sides. A total of 201 linear feet of fence, and entrance and exit gates of 12 feet each, would be needed to fence the two sides.



### Amount of Land Needed for Market Site

The layout of the truck wash shown in figure 2 is on a tract of land 36 feet wide and 189 feet long, and contains 756 square yards, or less than 1/4 acre. A two-stall truck wash of these dimensions is adequate to permit a free flow of small and large trucks through the facility. However, this width and depth cannot be materially decreased without impairing efficiency.

The entrance apron requires 280 square yards, two wash stalls 228 square yards, auxiliary house 9 square yards, and the exit apron 239 square yards.

The cost of the land, placed in condition to build, must be added to the estimated cost of constructing the facilities to determine the total market cost. Because of variation in land costs, no estimates of such costs are made in this report.

### Expansion of Facility

It is suggested that any market constructing a truck wash should provide at the outset for its expansion, because this minimizes expansion costs. Figure 2 also shows the possible expansion of a two-stall truck wash to four stalls. The length of the wash would remain the same, but the width would be doubled. Thus, the entrance and exit aprons and the wash stall area would require about twice the area of the two-stall wash. The entrance apron and the stall area would be double in size. The exit apron would be slightly more than doubled, because the auxiliary house for a two-stall wash should be adequate for four stalls. The sump for a two-stall wash also should be adequate for the expanded facility.

### Estimated Costs of Construction

Estimated costs of the two-stall facility are shown below. These costs are based on general construction costs in 1959 and are presented only as a guide for use by market operators in estimating the investment required to construct a facility of the kind and size proposed. They are not intended to replace the estimates of local contractors at the time and place of construction.

<u>Item</u>	<u>Dollars</u>
Approach and exit aprons	
Paving (rolled gravel) 519 sq. yds. @ \$0.75 per sq. yd. ....	389
Wash stalls	
Flooring and curbs (concrete on gravel base)	
221 sq. yds. @ \$5.00 per sq. yd. ....	1,105
Siding, 1,440 sq. ft.. of corrugated sheet metal, 12 20-ft. poles, 3 25-ft. poles, and 391 ft. of 2 by 6 inch bracing.....	408

<u>Item</u>	<u>Dollars</u>
Wash stalls (continued)	
Lighting, 2 200-watt bulbs and reflectors and wiring.....	100
Drainage, 50 ft. of 12-inch open drain, grates, and a 4 by 6 by 4 ft. sump.....	400
Water system, 40 ft. of 4-inch water main, tap-off pipe, 2 50-ft. 1-inch water hoses with nozzles, and 1 guidepost.....	215
Auxiliary house	
8 by 10 ft. cinder block building, 200-gal. disinfectant tank, 1 50-ft. 3/8-inch hose with nozzle, and 1-HP centrifugal pump.....	677
Fencing	
201 linear ft. of wire fence @ \$0.50 per linear ft. and 2 12-ft. gates @ \$25.00 each.....	<u>150</u>
Total.....	3,444





